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Krawietz

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[54] **FUNNEL FOR A SPINNING MACHINE**

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[52] **U.S. Cl.** **57/354**; 57/67; 57/74; 57/115; 57/127

[58] **Field of Search** 57/74, 67–71, 57/115–117, 127, 352–355

[56] **References Cited**

U.S. PATENT DOCUMENTS

775,549	11/1904	Alexander et al.	57/70
2,500,827	3/1950	Ickringill	57/115
4,437,300	3/1984	Vignon	57/67 X
4,592,196	6/1986	Wolf	57/67 X
4,779,409	10/1988	Marchiori et al.	57/354

FOREIGN PATENT DOCUMENTS

0225660	6/1987	European Pat. Off. .	
3400327	7/1985	Fed. Rep. of Germany .	
1029823	5/1966	United Kingdom	57/67
1030853	5/1966	United Kingdom	57/67
1080283	8/1967	United Kingdom	57/115

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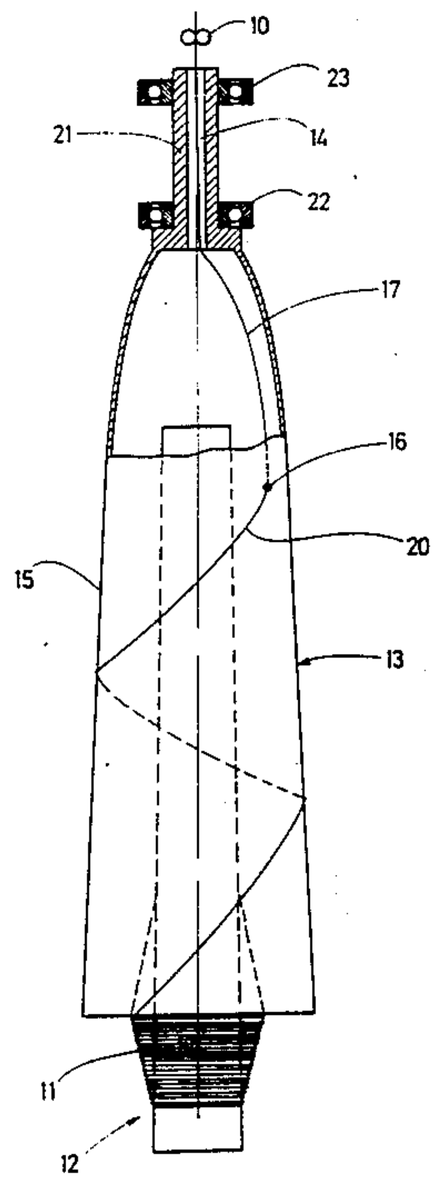
[57] **ABSTRACT**

A funnel for delivering yarn for building a package on a spindle of a spinning machine has an entry channel for the passage of yarn therethrough into the interior of the funnel and an exit opening for the passage of yarn therethrough from the interior to the exterior of the funnel, the interior of the funnel having a lateral extent sufficient to allow the formation of a yarn balloon of controlled extent during building of the package on the spindle. The funnel can contain a guide portion projecting interiorly of the funnel at a spacing from the entry channel and a neck portion in which the entry channel is formed.

4 Claims, 2 Drawing Sheets



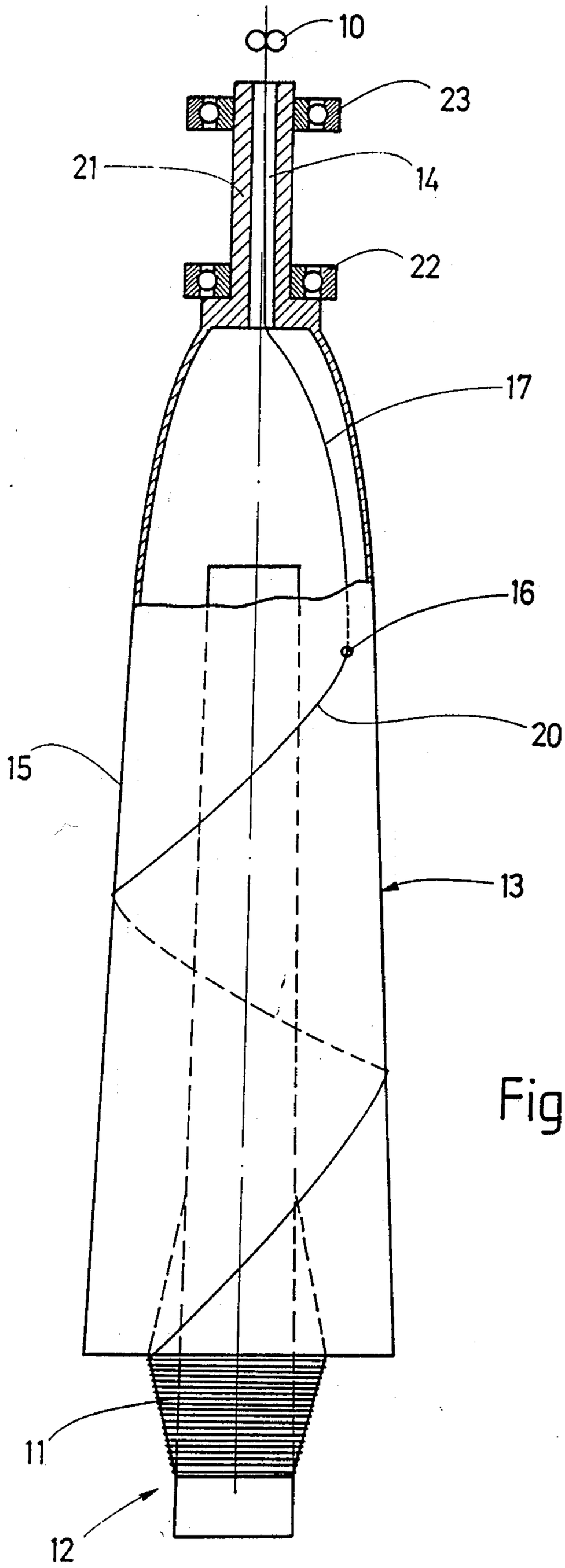


Fig. 1

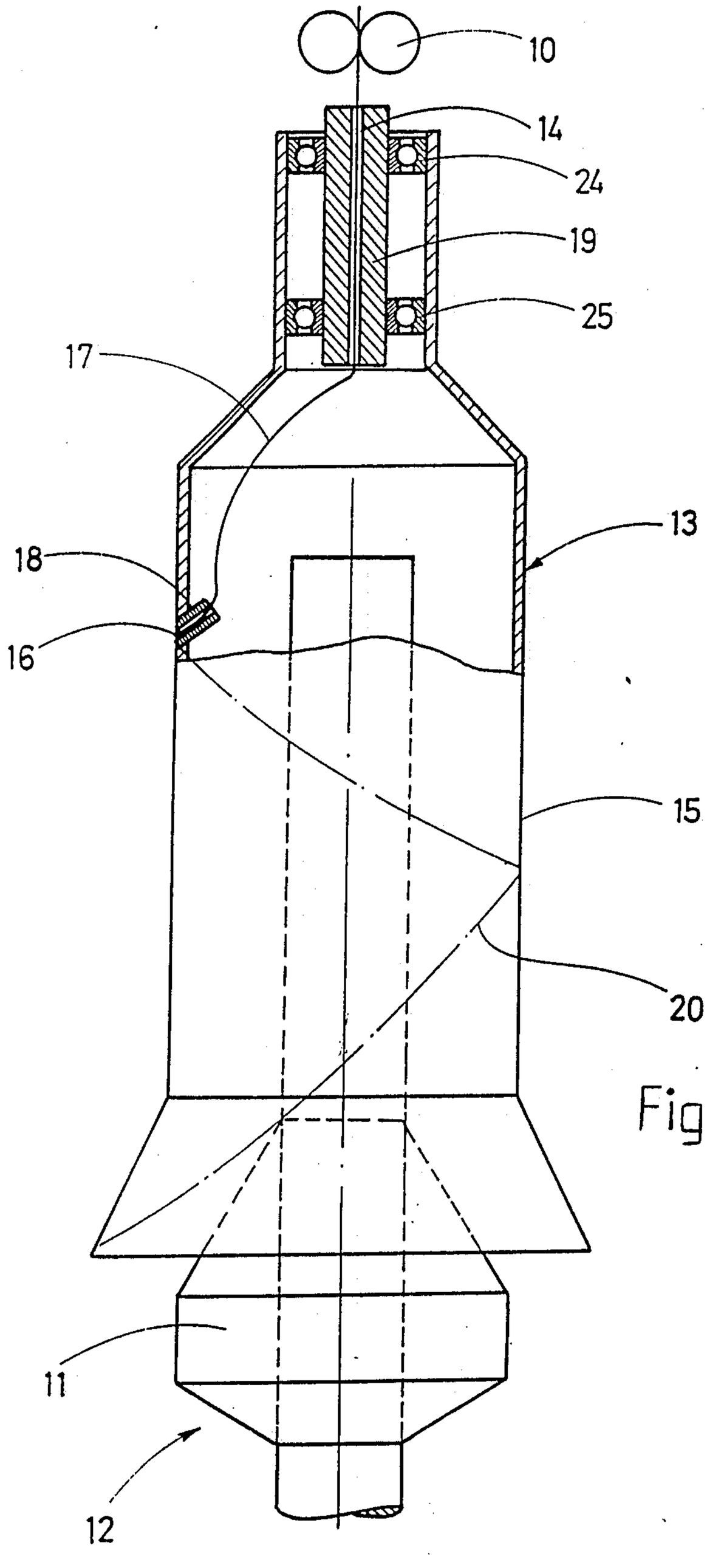


Fig. 2

FUNNEL FOR A SPINNING MACHINE

BACKGROUND OF THE INVENTION

The present invention relates to a funnel for a spinning machine. More particularly, the present invention relates to a funnel for guiding yarn onto a rotating spindle to form a package thereon.

One known phenomena which occurs during spinning on a ring spinning machine is the creation of a yarn balloon. For example, a yarn balloon can form between a yarn guide which guides yarn to a spindle through a traveler rotatable around the spindle. The formation of balloons is one reason why the spinning speed must be limited. For example, the balloon will detrimentally create some wind resistance as well as exert a centrifugal force.

In German Patent A 34 00 327, a funnel for a spinning machine is disclosed which completely suppresses the formation of yarn balloons. The patent discloses regulating the differences occurring in the winding speed, and thus, the yarn tension, by controlling the travel of the yarn over the surface of the funnel. The increase in the rate of travel of the yarn over the surface of the funnel is dependent upon the yarn tension. However, the yarn tension relative to the entire ring spinning machine is relatively small.

SUMMARY OF THE INVENTION

The present invention provides an apparatus which improves the conditions in which self-actuated regulation of the yarn tension will occur.

The present invention provides an apparatus for realizing the benefits of yarn balloons without incurring the disadvantage of these balloons. Since the yarn balloon formed in accordance with the present invention rotates inside the funnel, the balloon is of controlled size and offers virtually no significant air resistance. In accordance with the present invention, the air inside of the funnel of the present invention can be rotated with the yarn so that substantially no relative movement between the yarn balloon and the funnel occurs. Additionally, the yarn balloon formed in accordance with the present invention is relatively small so that the centrifugal forces occurring during high rates of travel of the yarn can be effectively handled.

The present invention provides, in an apparatus for delivering yarn for building a package on a spindle of a spinning machine, a funnel including an entry channel for the passage of yarn therethrough into the interior of the funnel and an exit opening for the passage of yarn therethrough from the interior to the exterior of the funnel, the interior of the funnel having a lateral extent sufficient to allow the formation of a yarn balloon of controlled extent during building of the package on the spindle. Preferably, the exit opening is longitudinally spaced from the opening of the entry channel into the interior of the funnel.

In one modification of the funnel of the present invention, a guide portion is provided on the funnel communicating with the exit opening and projecting interiorly of the funnel at a spacing from the entry channel, the guide portion being adjustable to adjust the spacing between the guide portion and the entry channel.

In another modification of the funnel of the present invention, the funnel has a neck portion in which the entry channel is formed. Preferably, the neck portion is

adjustable to adjust the spacing between the exit opening and the entry channel.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a front elevational view in partial vertical section of the funnel of one preferred embodiment of the present invention; and

FIG. **2** is a front elevational view in partial vertical section of a funnel of another embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. **1**, one preferred embodiment of the present invention is illustrated for use with yarn which is delivered through a pair of delivery rollers **10** to a funnel **13** from which the yarn is wound onto a package **11** on a spindle **12**. The yarn **20** travels from the delivery rollers **10** through an entry channel **14** in the funnel **13** to the inside of the funnel and exits through an exit opening **16** to the outside surface **15** of the funnel. The yarn **20** travels in a spiral-like manner about the outside surface **15** of the funnel **13** as it is wound onto the package **11**. The funnel **13** is rotatably mounted to the spinning machine by means of a pair of spaced bearings **22, 23** cooperatively engaging a neck portion **21** of the funnel **13** in which the entry channel **14** is located.

During its travel through the interior of the funnel, the yarn **20** extends from the interior open end of the entry channel **14** to the exit opening **16** and this region of the interior of the funnel is constructed with sufficient lateral extent, with respect to the axis of the funnel, that a balloon **17** forms during spinning of the yarn **20** sufficient to accommodate accelerations and decelerations of the yarn **20** during the building of the package **11** on the spindle **12**. The size of the balloon **17**—that is, the extent of the deviation of the yarn forming the balloon from a straight line connecting the interior end of the entry channel **14** and the exit opening **16**—is dependent upon the axial position of the opening **16** with respect to the end of the entry channel **14** and the rate of rotation of the funnel **13**. In one modification of the preferred embodiment of the present invention, the funnel **13** is provided with a plurality of openings **16**, each in a different axial position with respect to the interior open end of the entry channel **14**.

In FIG. **2**, another embodiment of the present invention is illustrated and includes a funnel **13** having an entry channel **14** in which yarn **20** delivered through a pair of rollers **10** passes into the interior of the funnel and exits through an exit opening **16** in the funnel to the outer surface **15** of the funnel to be wound onto a package **11** on a spindle **12**. The entry channel **14** is formed in a neck portion **19** which is rotatably supported within the upper axial end of the funnel **13** by a pair of bearing assemblies **24, 25**. The funnel **13** is mounted in a fixed position with respect to the rollers **10**.

A tubular guide portion **18** is communicated with the exit opening **16** and projects into the interior of the funnel **13**. The end of the guide portion **18** distal from the exit opening **16** and the axial end of the entry channel in the neck portion **19** opening into the interior of the funnel **13** are positioned relative to one another such that a balloon **17** of the yarn **20** forms during spinning. The guide portion **18** insures that the balloon **17** is sufficiently inwardly spaced from the inner surface of the funnel **13** that the balloon does not contact the inner surface. The radial distance between the distal end of

the guide portion **18** and the axis of the funnel **13** is one factor which influences the circumferential speed of the balloon **17**. In this respect, the embodiment illustrated in FIG. **2** may utilize a guide portion **18** which is adjustable along its length or is exchangeable for another guide portion of a different length, so that the radial distance between the distal end of the guide portion **18** and the axis of the funnel **13** can be varied.

In the modification of the embodiment illustrated in FIG. **2**, the upper end of the funnel **13** is supported by bearings on the neck portion **19** permitting a range of selective relative positioning of the neck portion **19** and the funnel **13** axially with respect to one another whereby the neck portion **19** is axially adjustable with respect to the funnel **13** so that the axial position of the axial end of the neck portion **19** with respect to the exit opening **16** and guide portion **18** can be varied.

It will therefore be readily understood by those persons skilled in the art that the present invention is susceptible of a broad utility and application. Many embodiments and adaptations of the present invention other than those herein described, as well as many variations, modifications and equivalent arrangements will be apparent from or reasonably suggested by the present invention and the foregoing description thereof, without departing from the substance or scope of the present invention. Accordingly, while the present invention has been described herein in detail in relation to its preferred embodiment, it is to be understood that this disclosure is only illustrative and exemplary of the present invention and is made merely for purposes of providing a full and enabling disclosure of the invention. The foregoing disclosure is not intended or to be construed to limit the present invention or otherwise to exclude any such other embodiments, adaptations, variations, modifications and equivalent arrangements, the present invention being limited only by the claims appended hereto and the equivalents thereof.

I claim:

1. In an apparatus for delivering yarn for building a package on a spindle of a spinning machine, a funnel comprising:

a neck portion defining a yarn entry channel and a coaxial annular funnel body portion defining an open interior area communicating at one end of said funnel body portion with said entry channel of said neck portion and open at the opposite end of said funnel body portion for receiving said spindle, said funnel body portion defining a yarn exit opening at an axial spacing from said entry channel of said neck portion and having an exterior yarn guide surface extending axially from said yarn exit opening to said opposite end of said funnel body portion, said yarn entry channel of said neck portion being adapted for delivering yarn into said interior area of said funnel body portion and said exit opening of said funnel body portion being adapted for passage of yarn from said interior area of said funnel body portion to said exterior yarn guide surface thereof, said yarn entry channel being of a sufficiently constricted cross-section for the passage of yarn therethrough in a substantially longitudinal path into said interior area of said funnel body portion, said interior area of said funnel body portion being of a sufficiently enlarged cross-section in relation to said entry channel of said neck portion and in relation to said spindle and said exit opening of said funnel body portion being sufficiently spaced from said yarn entry channel of said neck portion for causing yarn to balloon while traveling within said interior area of said funnel body portion between said entry channel of said neck portion and said exit opening of said funnel body portion, the cross-section of said interior area of said funnel body portion controlling the amount of yarn ballooning.

2. In an apparatus for delivering yarn for building a package on a spindle of a spinning machine, a funnel according to claim **1** and characterized further by a guide portion on said funnel and communicating with said exit opening for passage of yarn from the interior of said funnel through said guide portion and said exit opening, said guide portion projecting interiorly of said funnel at a spacing from said entry channel.

3. In an apparatus for delivering yarn for building a package on a spindle of a spinning machine, a funnel according to claim **2** and characterized further in that said guide portion is adjustable to adjust the spacing between said guide portion and said entry channel.

4. In an apparatus for delivering yarn for building a package on a spindle of a spinning machine, a funnel according to claim **1** and characterized further in that said neck portion and said funnel body portion are axially adjustable relative to one another to adjust the spacing between said exit opening and said entry channel.

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